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### Intelligence, education, and mortality

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Chapple at <http://podcasts.bmj.com/bmj/>

damaged body of a loved one is a high risk strategy, and research to date has shown that although some people find viewing therapeutic others regret it (in the short term at least).

Chapple and Ziebland's study helps with this dilemma, because it finds that the value of viewing is significantly affected by whether or not the person thought that they had been given a real choice in the matter; those who regretted seeing the body were more likely to have been "forced" to see it. Although they do not specify situations in which choice may be lost, the most likely circumstance would be when identification is required. This is an important point that professionals would do well to reflect on when routinely asking a family member to identify the body. In such traumatic circumstances families do not always realise (and often do not take in the information given to them) that identification is a choice; this legal requirement can be fulfilled in other ways. This does not mean that families should be protected from the distress of seeing the body, but that if viewing is to be a choice it can occur in more conducive circumstances at a later time, when they have had the opportunity to consider properly whether they wish to view. That said, some family members are anxious to see their loved one as soon as possible in whatever circumstances (as reported by Awoonor-Renner in her autobiographical article on the death of her son<sup>7</sup>), but this is a choice rather than an obligation and, as such, should be respected wherever possible.

A further important finding from Chapple and Ziebland's study is that the language that bereaved

people use when referring to the deceased may help professionals when guiding them about viewing. Speaking of the deceased by name or using a personal pronoun points to a continuing sense of relationship. In these circumstances viewing the body, if it is handled slowly and sensitively, may facilitate grief. Indeed, bereavement theories now suggest that people do not resolve their grief by "letting go" but may continue to engage in some form of relationship with the deceased that intensifies or lessens over time.<sup>8</sup> Being able to view the body and to "talk" with the deceased person is one way of dealing with "unfinished business," such as telling the person that you love them, or simply saying goodbye. To some people this may sound strange or morbid, but sociological studies of dying and death have shown that social death (and the termination of social relationships) rarely coincides with clinical death.<sup>9</sup>

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## Intelligence, education, and mortality

Are linked in several ways, so strategies to reduce inequalities should be broadly based

RESEARCH, doi:10.1136/bmj.c654 and doi:10.1136/bmj.b5282

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Socioeconomic status can be indexed in a variety of ways, but usually on the basis of an individual's occupational social class, income, education, and housing tenure. Data accumulated over several decades show that these characteristics are associated with differences in health, particularly within affluent societies. With the exception of few outcomes—incidence of breast cancer in women and selected injuries—poorer health is more common in poorer people.<sup>1</sup> Moreover, this gradient seems to be apply across the full socioeconomic range, rather than being confined to the most disadvantaged end of the spectrum. A worldwide reduction in these differentials has become a priority for many governments, including that of the United Kingdom,<sup>1</sup> and for the World Health Organization, which in 2005 launched the Global Commission on Social Determinants of Health.<sup>2</sup>

In endeavouring to ameliorate health inequalities, it is important to understand the underlying causes; two *BMJ* studies attempt to describe the gradient more clearly<sup>3</sup> and understand what factors explain it.<sup>4</sup> In a study from Norway (doi: 10.1136/bmj.c654), Strand and colleagues

assess the relation between educational inequalities and mortality from 1960 to 2000.<sup>3</sup> In the second study (doi: 10.1136/bmj.b5282), Lager and colleagues investigated the association between early IQ, educational attainment, and mortality in Sweden.<sup>4</sup>

Despite these two studies being carried out in egalitarian societies, which have free national healthcare provision that is widely regarded as being among the best in the world, as has been shown elsewhere, socioeconomic gradients persist, even though they are less pronounced. So how does poverty "get under the skin" to exert its deleterious effect on health? Possibilities include access to resources, environmental exposures, health related behaviours, and their physiological correlates. But studies that take these preventable behavioural and physiological risk factors into account fail to eliminate socioeconomic gradients in health.<sup>5</sup> This raises the possibility that as yet unmeasured variables—including psychological characteristics—also need to be considered.

Recently, Linda Gottfredson proposed that intelligence might be "the epidemiologists' elusive 'fundamental

cause' of social class inequalities in health."<sup>6</sup> This idea is based on two observations. Firstly, intelligence test scores—measured by individually or group administered tests—are socially patterned, whereby children and adults from socially deprived backgrounds typically have worse results.<sup>7</sup> Secondly, lower intelligence test results across the life course, even in youth,<sup>8</sup> are associated with higher mortality and rates of disease many years later. This is exemplified by data from a cohort of one million Swedish men who were administered an IQ test in late adolescence.<sup>9</sup> After two decades of mortality surveillance during which 15 000 deaths occurred, we see a stepwise gradient between mortality and intelligence across the full range of intelligence scores such that lower intelligence is associated with the greatest risk (figure).<sup>9</sup>

If Gottfredson's thesis is correct, statistically adjusting the association between socioeconomic position and health for intelligence would eliminate any gradient.<sup>10</sup> In framing her hypothesis so provocatively, Gottfredson has probably asked too much: it is unlikely that any single characteristic will completely explain the socioeconomic gradient in mortality. In addition to testing this hypothesis, Lager and colleagues also ask the opposite question: is the intelligence-mortality gradient explained by socioeconomic status?<sup>4</sup>

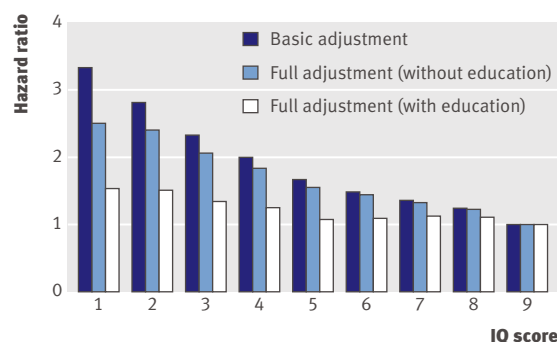
The answer to both of the above questions seems to be that controlling for either intelligence or education, partially but not completely "explains" the respective associations with mortality; these observations are supported by the current literature.<sup>10</sup> However, using education as their primary marker of socioeconomic status raises concerns regarding colinearity: the correlation with intelligence is strong, so educational outcomes probably capture differences in cognitive ability.<sup>9</sup>

Observational evidence should be interpreted cautiously because the extent to which one construct explains the effect of another depends on how precisely these two entities have been measured. In the US national longitudinal survey of youth, for example, the effect of a single measurement of intelligence on mortality disappeared completely after statistical control for socioeconomic circumstances that were measured 19 times during

follow-up.<sup>11</sup> In contrast, the effect of socioeconomic position was little affected by adjustment for the one-off measurement of intelligence. Presumably, if intelligence had been measured with much higher precision than socioeconomic position these data would have supported a reverse conclusion.

Surprisingly, Lager and colleagues also report a higher risk of mortality in older women with higher rather than lower intelligence in childhood.<sup>4</sup> Being based on subgroup analysis, where spurious findings can surface by chance, this result remains suggestive. Furthermore, given that, in both men and women, education and mortality, and education and intelligence, have similar magnitudes of association, it is surprising to see an association between intelligence and mortality only in men. In female participants in the 1932 Scottish mental surveys, higher scores on intelligence tests administered at 11 years were associated with lower deaths rates up to 76 years later.<sup>12</sup> Lager and colleagues' discussion stated that this finding was limited to deaths occurring only during the second world war, but this was not the case. Until the apparent sex differences in these results are resolved, it is probably also too early to use Lager and colleagues' results to make a conclusion about the state of the system integrity hypothesis—the notion that higher intelligence may be a marker of a general latent trait of a well functioning body.

If intelligence contributes to observed socioeconomic inequalities in mortality through a variety of mechanisms, then the efforts to reduce inequalities should continue to be broadly based, including educational opportunities and interventions initiated in early life. These may also elicit improvements in intelligence, although efforts to do so have so far yielded disappointing results.<sup>13</sup>



Relation between IQ score and total mortality in 994 262 Swedish men (14 498 deaths). Multiple adjustment comprises age at testing, conscription testing centre, birth year, parental social class, height, body mass index, blood pressure (systolic and diastolic), and illness (psychiatric and somatic). The referent is the highest scoring IQ group (category 9). Reproduced, with permission, from Batty et al<sup>9</sup>

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